

ABSTRACT

The present invention provides nucleotide sequences and corresponding amino acid sequences for a gene which confers the ability to adapt to low oxygen, i.e., hypoxic conditions. These sequences are referred to as SH2A and SH2A-like sequences. Genetic constructs and chimeric genes comprising these sequences are also provided. The nucleotide and amino acid sequences may be used to transform bacteria, yeasts, fungi, animal and plant species in order to modulate the level and/or activity of SH2A or SH2A-like protein. Also provided are transgenic plants, plant cells and host cells which express an SH2A or SH2A-like gene. Methods for modulating growth or survival of cultured cells under hypoxic conditions, and methods for altering growth response in cells, tissues, or organs of an organism are also provided. In addition, methods for producing plants adapted to growth in hypoxic conditions, methods for improving water logging tolerance in a plant, methods for inducing gibberellin biosynthesis in a plant cell and methods of regulating an anaerobic response in a plant cell are provided by the present invention. The compositions and methodologies of the present invention find a myriad of uses in the horticultural, agricultural, medical, fermentation, and cell culture industries.